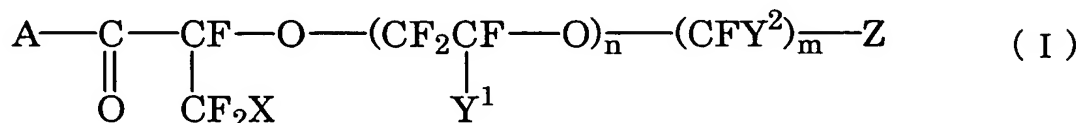


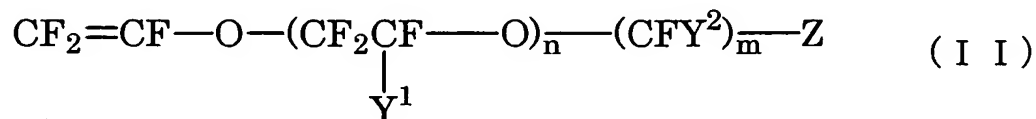
CLAIMS

1. A method for producing a water-soluble
fluorine-containing vinyl ether

- 5 which comprises subjecting a fluorine-containing
2-alkoxypropionic acid derivative represented by the following
general formula (I):



- 10 (wherein A represents $-\text{OM}^1$ or $-\text{OM}_{1/2}^2$, and M^1 represents an alkali
metal and M^2 represents an alkaline earth metal; X represents
a halogen atom; Y^1 and Y^2 are the same or different and each
represents a fluorine atom, a chlorine atom, a perfluoroalkyl
group or a fluorochloroalkyl group; n represents an integer of
15 0 to 3, and n of Y^1 s may be the same or different; m represents
an integer of 1 to 5, and m of Y^2 s may be the same or different;
and Z represents a hydrophilic group) to thermal decomposition
at a temperature of not lower than 50°C but lower than 170°C
in the presence of a coordinating organic solvent to give a
20 water-soluble fluorine-containing vinyl ether represented by
the following general formula (II):



- (wherein Y^1 , Y^2 , Z, n and m are as defined above),
25 said coordinating organic solvent having a coordinating
property with an ion of said M^1 or an ion of said M^2 and
 said coordinating organic solvent being in an amount of
10 to 1,000 parts by mass per 100 parts by mass of said
fluorine-containing 2-alkoxypropionic acid derivative.

2. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1,

wherein the hydrophilic group is $-\text{COOM}^3$, $-\text{OSO}_3\text{M}^3$, $-\text{SO}_3\text{M}^3$,
 5 $-\text{O}_2\text{PM}^3$, $-\text{OP}(\text{OM}^3)_2$, $-\text{O}_2\text{P}(\text{OM}^3)$, $-\text{OPO}(\text{OM}^3)_2$, $-\text{PO}_2(\text{OM}^3)$, $-\text{PO}(\text{OM}^3)_2$,
 $-\text{COOM}^4_{1/2}$, $-\text{OSO}_3\text{M}^4_{1/2}$, $-\text{SO}_3\text{M}^4_{1/2}$, $-\text{O}_2\text{PM}^4_{1/2}$, $-\text{OP}(\text{OM}^4_{1/2})_2$,
 $-\text{O}_2\text{P}(\text{OM}^4_{1/2})$, $-\text{OPO}(\text{OM}^4_{1/2})_2$, $-\text{PO}_2(\text{OM}^4_{1/2})$, $-\text{PO}(\text{OM}^4_{1/2})_2$, or a
 substituted ammonio group forming a salt with a conjugate base
 of an inorganic acid or fatty acid (its substituents being two
 10 or three alkyl groups which are the same or different), wherein
 M^3 represents an alkali metal, a hydrogen atom or $\text{NR}^1\text{R}^2\text{R}^3\text{R}^4$ in
 which R^1 , R^2 , R^3 and R^4 are the same or different and each
 represents a hydrogen atom or an alkyl group containing 1 to
 4 carbon atoms, and M^4 represents an alkaline earth metal.

3. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1 or 2,
 wherein the thermal decomposition is carried out at a
 temperature not lower than 50°C but lower than 150°C .

4. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2 or 3,
 wherein the coordinating organic solvent is in an amount
 of 30 to 300 parts by mass per 100 parts by mass of the
 25 fluorine-containing 2-alkoxypropionic acid derivative.

5. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2, 3 or
 4,

30 wherein the coordinating organic solvent comprises an
 aprotic polar organic solvent.

6. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 5,

35 wherein the aprotic polar organic solvent is an ether

solvent, sulfolane, hexamethylphosphoric triamide, acetonitrile, dimethylformamide, dimethyl sulfoxide, ethyl acetate and/or tetramethylurea.

- 5 7. The method for producing a water-soluble
fluorine-containing vinyl ether according to Claim 6,
 wherein the ether solvent is a glyme-based solvent, a
diethyl ether, a diisopropyl ether, tetrahydrofuran, dioxane,
anisole and/or a crown ether.

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8. The method for producing a water-soluble
fluorine-containing vinyl ether according to Claim 7,
 wherein the glyme-based solvent is dimethoxyethane,
diethoxyethane, monoethylene glycol dimethyl ether,
15 diethylene glycol dimethyl ether, triethylene glycol dimethyl
ether, tetraethylene glycol dimethyl ether, diethylene glycol
monomethyl ether and/or diethylene glycol monoethyl ether.

9. The method for producing a water-soluble
20 fluorine-containing vinyl ether according to Claim 5, wherein
the aprotic polar organic solvent is a glyme-based solvent.

10. The method for producing a water-soluble
fluorine-containing vinyl ether according to Claim 5, 6, 7, 8
25 or 9,

 wherein the aprotic polar organic solvent has a water
content not exceeding 250 ppm.

11. The method for producing a water-soluble
30 fluorine-containing vinyl ether according to Claim 5,
 wherein the aprotic polar organic solvent is diethylene
glycol dimethyl ether.

12. The method for producing a water-soluble
35 fluorine-containing vinyl ether according to Claim 11,

wherein the diethylene glycol dimethyl ether has a water content not exceeding 250 ppm.

13. The method for producing a water-soluble
5 fluorine-containing vinyl ether according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12,

wherein the fluorine-containing 2-alkoxypropionic acid derivative represented by the general formula (I) has a water content not exceeding 0.1% by mass.

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14. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13,

wherein n is 0 or 1.

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15. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14,

wherein Z is $-\text{SO}_3\text{M}^3$ or $-\text{SO}_3\text{M}^{4}_{1/2}$.

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16. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15,

25 wherein Z is $-\text{SO}_3\text{M}^3$, A is $-\text{OM}^1$ or $-\text{OM}^{2}_{1/2}$, Y^1 is a trifluoromethyl group, Y^2 is a fluorine atom and m is 2.

17. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 16,
wherein n is 0.

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